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ABSTRACT

This instructional module describes procedures for training prospective and practicing teachers to use two strategies for enhancing the efficiency of instructing children with mild disabilities: manipulating attending cues and responses and using instructive feedback. The module contains the following information: (a) a description of the competencies to be acquired; (b) a rationale for the competencies; (c) a list of the objectives of the module; (d) a description of the learning activities and alternatives, including a list of relevant articles that learners should read on manipulations of the attending cues and/or attending responses and on instructive feedback; and (e) a content outline of training sessions. The content outline has five major sections: introduction to direct instruction, including the components of direct instruction; using attending cues/responses to increase the efficiency of direct instruction, including information on selecting attending cues/responses; using instructive feedback to increase the efficiency of instruction, including information on three types of instructive feedback; findings from research on attending cues/responses and instructive feedback; and recommendations for use of manipulations of the attending cues/responses and instructive feedback. A chart of a taxonomy of attending cues and responses is also included. (CR)

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Instructional Module:

Promoting the Efficiency of Direct Instruction by

Adding Non-Target Stimuli to Trial Sequences

Mark Wolery

1992

Learning Efficiently: Acquisition of Related Non-Target Behaviors

Project LEARN

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EC 305 306

Instructional Module:
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Purpose of the Module

This Instructional Module describes procedures for training prospective and practicing teachers to use two strategies for enhancing the efficiency of instruction; these are: (a) manipulating attending cues and responses, and (b) using instructive feedback. The Instructional Module is designed for use by faculty members in teacher preparation programs and for use by instructors of inservice training programs. Our intent is to disseminate the information from our research to as many individuals as possible; therefore, we give permission for users to reproduce the document and to use it, in whole or in part, in their own training and research activities. We request, however, that any reproductions contain the acknowledgement and disclaimer that the module was developed by the a grant (Project LEARN, Grant Number H023C00125) from the U.S. Department of Education.

Disclaimer and Acknowledgements

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Description of the Module

This module contains several sections:

- (a) competencies to be acquired,
- (b) rationale for the competencies,
- (c) objectives,
- (d) prerequisites for learners,
- (e) evaluation criteria,
- (f) suggested learning activities, and
- (g) content outline for training sessions.

It is designed to train students to manipulate attending cues and attending responses and to use instructive feedback. However, training could be provided for either manipulation (i.e., attending cues/responses or instructive feedback) using the module. Two manuals accompany this module, and the module is prepared with the assumption that learners will have access to the manuals. These manuals are available from the authors.

Holcombe-Ligon, A., Wolery, M., & Werts, M. G. (1992). Using attending cues to increase the efficiency of direct instruction. (U.S. Department of Education, Grant No. H023C00125). Unpublished training manual. Allegheny-Singer Research Institute, 320 E. North Avenue, Pittsburgh, PA 15212.

Werts, M. G., Wolery, M., & Holcombe, A. (1991). Instructive feedback: Increasing opportunities for learning through the addition of incidental information. (U.S. Department of Education, Grant No. H023C00125). Unpublished training manual. Allegheny-Singer Research Institute, 320 E. North Avenue, Pittsburgh, PA 15212.

Instructional Module:
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COMPETENCIES TO BE ACQUIRED

1. Learners will describe basic components of direct instruction.
2. Learners will describe the steps for using attending cues and attending responses to increase the efficiency of direct instruction.
3. Learners will describe the steps for using instructive feedback.
4. Learners will use attending cues and/or responses and instructive feedback to teach a student two target and non-target behaviors.

RATIONALE FOR COMPETENCIES

Substantial research indicates that the use of instructive feedback and manipulations of attending cues and responses can result in children acquiring both the behaviors targeted for direct instruction and the non-target stimuli that are presented by not taught directly. For instructive feedback, this finding occurs across learners with number of different disabilities and age ranges. Less research exists supporting the manipulations of attending cues and responses; however, for elementary-aged children with learning disabilities and mild mental retardation, the manipulations of the attending cues and responses have been quite effective.

OBJECTIVES

1. To describe the components of direct instruction.
2. To define attending cues and attending responses

3. To describe a classification system of attending cues and attending responses.
4. To describe the steps for using attending cues/responses for increasing the efficiency of direct instruction.
5. To define instructive feedback.
6. To describe the steps for using instructive feedback to increase the efficiency of instruction.

LEARNER PREREQUISITES

Learners should have knowledge and performance competencies related to systematic and direct instruction.

EVALUATION PROCEDURES AND CRITERIA

The instructor should develop their own evaluation procedures and criteria; however, within the manuals are self-tests of the content.

LEARNING ACTIVITIES AND ALTERNATIVES

1. Learners should read and complete the self-tests of the two accompanying manuals. These are:

Holcombe-Ligon, A., Wolery, M., & Werts, M. G. (1992). Using attending cues to increase the efficiency of direct instruction. (U.S. Department of Education, Grant No. H023C00125). Unpublished training manual. Allegheny-Singer Research Institute, 320 E. North Avenue, Pittsburgh, PA 15212.

Werts, M. G., Wolery, M., & Holcombe, A. (1991). Instructive feedback: Increasing opportunities for learning through the addition of incidental information. (U.S. Department of Education, Grant No. H023C00125). Unpublished training manual. Allegheny-Singer Research Institute, 320 E. North Avenue, Pittsburgh, PA 15212.

2. Learners should read the following articles that used manipulations of the attending cues and/or attending responses.

Preschool Children with Developmental Delays:

Alig-Cybrivsky, C., Wolery, M., & Gast, D. L. (1990). Use of a constant time delay procedure in teaching preschoolers in a group format. Journal of Early Intervention, 14, 99-116.

Elementary-Aged Children with Mild Disabilities

Gast, D. L., Doyle, P. M., Wolery, M., Ault, M. J., & Baklarz, J. L. (1991). Acquisition of incidental information during small group instruction. Education and Treatment of Children, 14, 1-18.

Keel, M., & Gast, D. L. (1992). Small group instruction for students with learning disabilities: A study of observational and incidental learning. Exceptional Children, 58, 357-368.

Shelton, B., Gast, D. L., Wolery, M., & Winterling, V. (1991). The role of small group instruction in facilitating observational and incidental learning. Language, Speech, and Hearing Services in Schools, 22, 123-133.

Winterling, V. (1990). The effects of constant time delay, practice in writing or spelling, and reinforcement on sight word recognition in a small group. Journal of Special Education, 24, 101-116.

Wolery, M., Ault, M. J., Gast, D. L., Doyle, P. M., & Mills, B. M. (1990). Use of choral and individual attentional responses with constant time delay when teaching sight word reading. Remedial and Special Education, 11, 47-58.

3. Learners should read the following articles that used instructive feedback.

General Issues with Instructive Feedback

Werts, M. G., Wolery, M., Gast, D. L., & Holcombe-Ligon, A. (1992). Instructive feedback: Increasing opportunities for additional learning. Manuscript submitted for publication. Allegheny-Singer Research Institute, Pittsburgh, PA.

Preschool Children with Developmental Delays:

- Werts, M. G., Wolery, M., Holcombe-Ligon, A., Vassilaros, M. A., Billings, S. S. (in press). Efficacy of transition-based teaching with instructive feedback. Education and Treatment of Children.
- Wolery, M., Holcombe, A., Werts, M. G., & Cipolloni, R. M. (in press). Effects of simultaneous prompting and instructive feedback. Early Education and Development.
- Wolery, M., Werts, M. G., Holcombe, A., Billings, S. S., Vassilaros, M. A. (in press). Comparison of simultaneous and alternating presentation of non-target information. Journal of Behavioral Education.

Elementary-Aged Children with Mild Disabilities

- Gast, D. L., Doyle, P. M., Wolery, M., Ault, M. J., & Baklarz, J. L. (1991). Acquisition of incidental information during small group instruction. Education and Treatment of Children, 14, 1-18.
- Shelton, B., Gast, D. L., Wolery, M., & Winterling, V. (1991). The role of small group instruction in facilitating observational and incidental learning. Language, Speech, and Hearing Services in Schools, 22, 123-133.

Elementary-Aged Children with Moderate Mental Retardation

- Gast, D. L., Wolery, M., Morris, L. L., Doyle, P. M., & Meyer, S. (1990). Teaching sight word reading in a group instructional arrangement using constant time delay. Exceptionality, 1, 81-96.
- Stinson, D. M., Gast, D. L., Wolery, M., & Collins, B. C. (1991). Acquisition of nontarget information during small-group instruction. Exceptionality, 2, 65-80
- Wolery, M., Doyle, P. M., Ault, M. J., Gast, D. L., Meyer, S., & Stinson, D. (1991). Effects of presenting incidental information in consequent events on future learning. Journal of Behavioral Education, 1, 79-104.

Secondary-Aged Children with Mild Disabilities

- Wolery, M., Cybriwsky, C. A., Gast, D. L., & Boyle-Gast, K. (1991). Use of constant time delay and attentional responses with adolescents. Exceptional Children, 57, 462-474.

Secondary-Aged Children with Moderate Mental Retardation

Doyle, P. M., Gast, D. L., Wolery, M., Ault, M. J., & Farmer, J. A. (1990). Use of constant time delay in small group instruction: A study of observational and incidental learning. Journal of Special Education, 23, 369-385.

Gast, D. L., Doyle, P. M., Wolery, M., Ault, M. J., Farmer, J. A. (1991). Assessing the acquisition of incidental information by secondary-age students with mental retardation: A comparison of response prompting strategies. American Journal on Mental Retardation, 96, 64-80.

4. View a video tape that describes and illustrates the use of manipulations of attending cues/responses and the use of instructive feedback.
5. Observe a teacher of children with disabilities implement direct instructional sessions.
 - 5.1 During the observation, outline the trial sequence used including specification of
 - (a) attending cues,
 - (b) attending responses,
 - (c) task direction,
 - (d) response interval,
 - (e) prompts used, and
 - (f) nature and type of feedback provided.
 - 5.2 During an observation, collect data on the teacher's use of each component of the trial sequence; including:
 - (a) attending cues,
 - (b) attending responses,
 - (c) task direction,
 - (d) response interval,
 - (e) prompts used, and
 - (f) nature and type of feedback provided.
6. Write an instructional program plan that uses each of the following types of attending cues/responses:
 - (a) general attending cue with an active attending response
 - (b) general attending cue with an inactive attending response
 - (c) specific attending cue with an active attending response
 - (d) specific attending cue with an inactive attending response

7. Under supervision from a trained person, implement direct instructional sessions using each of the following types of attending cues:
 - (a) a general attending cue implemented on every trial with each trial using the same attending cue,
 - (b) a general attending cue implemented on every trial with at least two attending cues implemented on alternating trials,
 - (c) a specific attending cue implemented on every trial with each trial using the same attending cue, and
 - (d) a specific attending cue implemented on every trial with at least two attending cues implemented on alternating trials.
8. Under supervision from a trained person, implement direct instructional sessions using each of the following types of attending responses:
 - (a) an inactive attending response for individual children implemented on every trial,
 - (b) an active attending responses for individual children implemented on every trial,
 - (c) an inactive attending response for a group of children implemented on every trial, and
 - (d) an active attending response for a group of children implemented on every trial.
9. Write an instructional program plan that uses each of the following types of instructive feedback:
 - (a) parallel,
 - (b) expansion, and
 - (c) novel.
10. Under supervision from a trained person, implement direct instructional sessions using each of the following types of instructive feedback:
 - (a) parallel,
 - (b) expansion, and
 - (c) novel.

CONTENT OUTLINE

This content outline relies heavily on information presented in the two instructional manuals that accompany this module.

1.0 Introduction to Direct Instruction

1.1 Components of direct instruction

1.1.1 Teachers have identified some important behaviors that their students should be taught

- Describe discrete behaviors
- Describe response chains

1.1.2 Direct instructional sessions are often relatively short

1.1.3 Direct instructional activities involve use of a defined trial sequence

- Describe common elements of trial sequences
 - ** securing students' attention
 - ** presenting the target stimulus
 - ** providing an opportunity to respond
 - ** providing and fading prompts (assistance)
 - ** delivering contingent feedback
- Describe variations of the elements of the trial sequence

1.1.4 Direct instructional activities involve active student responding

1.2 Evaluating the effects of direct instruction

1.2.1 Evaluating the effectiveness of direct instruction

- Define "effectiveness": children learn the behaviors that are taught
- Discuss measures for evaluating the effectiveness of instruction for different types of behaviors and different types of responses

1.2.2 Evaluating the efficiency of direct instruction

- Define "efficiency":**
 - ** Efficient instruction is effective (i.e., results in children acquiring the targeted behaviors)**
 - ** Efficiency refers to some relative value of one instructional strategy or practice over another (i.e., results in superior learning)**
- Discuss means for measuring the relative value (superiority) of one strategy over another**
 - ** Rapidity of learning measured by the number of sessions, number of trials, number of minutes of instruction to criterion, and the number and percentage of errors to criterion**
 - ** Breadth of learning measured by the number of target and non-target behaviors that are acquired during instruction**
 - oo target behaviors are those that are taught directly**
 - oo non-target behaviors are those that are presented but not taught directly and assumed to be learned from observational and/or incidental learning processes**

2.0 Using Attending Cues and Attending Responses to Increase the Efficiency of Direct Instruction

2.1 Define attending cues and attending responses

2.1.1 Attending cues are the behaviors teachers do to get children to orient toward and focus on the target stimulus

2.1.2 Attending responses are the behaviors children do in response to attending cues that indicate they are ready to respond

2.2 Describe classification of attending cues and attending responses using the taxonomy presented on the next page

Taxonomy of Attending Cues/Responses

Presentation Variables	Response Variables			
	Individual		Group	
	Active	Inactive	Active	Inactive
Type Across Trials				
Nature of Cue				
<u>Same for Each Trial</u>				
General	On each trial the teacher says, "Look" & only the target student must look at the stimulus	On each trial the teacher says, "Time to work" & no response is required of any student	On each trial the teacher says, "Look" & all of the students must look at the stimulus	On each trial the teacher says, "Time to work" & no response is required of any student
Specific	On each trial the teacher says, "Name the letters" & only the target student names the letters	On each trial the teacher says, "Look" to the target student & the teacher names the letters	On each trial the teacher says, "Name the letters" & all group members name the letters	On each trial the teacher says, "Look" to the group and the teacher names the letters for the group
<u>Different Across Trials</u>				
General	Across different trials, the teacher says, "Look," "Touch," "Hold," or "Listen" (1 per trial); & only the target student must comply with the cue	Across different trials the teacher says, "Time to work," "Let's start," "I'm ready" (1 per trial); and no response is required of any student	Across different trials the teacher says "Look," "Touch," "Hold" or "Listen" (1 per trial); & all students must comply with the cue	Across different trials the teacher says, "Time to work," "Let's start," "I'm ready" (1 per trial); & all students must comply with the cue
Specific	Across different trials, the teacher says, "Name the letters," "Match," or "Trace these" (1 per trial); & only the target student must comply with the cue	Across different trials the teacher says, "Look" or "Listen" to the target student & the teacher names, matches, or traces the stimuli (1 per trial; no response required of student	Across different trials the teacher says "Name the letters," "Match," or "Trace these" (1 per trial) & all students must comply with the cue	Across different trials the teacher says, "Look" or "Listen" to group & teacher names, matches, or traces stimuli (1 per trial) for all students; no response is required of any student

- 2.3 Describe questions to be asked when selecting attending cues and responses**
 - 2.3.1 Will I use the same attending cue on each trial?**
 - 2.3.2 What type of attending cue (general or specific) will be used?**
 - 2.3.3 Will I require students to respond individually or as a group?**
 - 2.3.4 Will I require students to respond actively or inactively?**
- 2.4 General guidelines for selecting attending cues and attending responses**
 - 2.4.1 Use the quickest and easiest attending cue and response necessary to ensure that students orient toward the target stimulus**
 - 2.4.2 With children who are not making progress, use specific attending cues and active attending responses that demonstrate clearly that the student is attending to the critical aspects of the stimulus**
- 2.5 Steps for adding extra, non-target stimuli to the attending cues and/or attending responses**
 - 2.5.1 Deciding what extra, non-target (incidental) stimuli (information, content) will be added to the attending cue and/or attending response**
 - 2.5.2 Deciding whether one or two or more "pieces" of information will be added to the attending cues/responses**
 - 2.5.3 Deciding on which trials (all, intermittent, alternating, etc.) the extra, non-target stimuli will be presented in the attending cues/responses**
 - 2.5.4 Deciding on the mode (visual, verbal, visual and verbal, other) through which the extra, non-target stimuli will be presented in the attending cues/responses**
 - 2.5.5 Determining what response to the attending cue will be expected from the students**
 - 2.5.6 Deciding how the students' acquisition of the extra, non-target stimuli will be monitored and assessed**

3.0 Using Instructive Feedback to Increase the Efficiency of Instruction

3.1 Define Instructive Feedback

3.1.1 Instructive feedback is the presentation of extra, non-target behaviors during consequent events for students' responses to target behaviors

3.1.2 Students are not expected to respond to the presentation of the instructive feedback stimuli

3.1.3 Students are not reinforced if they do respond to the presentation of the instructive feedback stimuli

3.2 Describe the three types of instructive feedback

3.2.1 Expansion instructive feedback involves presenting a stimulus that is from the same curricular domain as the target behavior and is conceptually related to the target behavior

3.2.2 Parallel instructive feedback involves presenting a stimulus that has the same response as the target stimulus

3.2.3 Novel instructive feedback involves presenting a stimulus that is not from the same curricular domain as the target stimulus and is not conceptually related to it

3.3 Steps for using instructive feedback to increase the efficiency of direct instruction

3.3.1 Identify the behaviors that the student needs to learn, select an instructional technique, and select a time and format for teaching

3.3.2 Select the stimuli (extra, non-target information) that will be presented through instructive feedback

3.3.3 Determine how the target stimuli will be presented

3.3.4 Determine how and when the instructive feedback stimuli (extra, non-target stimuli) will be presented

3.3.5 Determine how the students are expected to respond to the target stimuli

- 3.3.6 Determine what responses are expected, if any, from the student to the instructive feedback stimuli
 - 3.3.7 Determine how acquisition of the target behaviors will be monitored
 - 3.3.8 Determine how acquisition of the instructive feedback behaviors will be monitored
 - 3.3.9 Decide how to adjust instruction if students do not acquire the behaviors being taught directly and indirectly
- 4.0 Describe the findings from research where attending cues/attending responses and instructive feedback has been used
- 4.1 Findings from the manipulation of the attending cues/attending responses
 - 4.1.1 During direct instruction, if children (a) are not acquiring the target behaviors, (b) the target behaviors are within the range of appropriate skills (i.e., the children have the prerequisites for the skill), and (c) reinforcers are being used, then use of specific attending cues and active attending responses that provides additional information and focuses attention on the distinctive features of the target stimulus may result in children acquiring the target behaviors and in some cases acquisition of the non-target stimulus
 - 4.1.2 When teaching sight word reading to preschool and elementary-age children, having them (a) repeat the letters of the words after the teacher names them but before the teacher asks them to read the word, (c) say the letters of the word without a teacher model before the teacher asks them to read the word, and (d) writing the letters in order from a visual model before being asked to read the word will result in students learning to spell the words as well as read the words
 - 4.1.3 Active attentional responses (e.g., writing a word before reading it) as compared to inactive responses (e.g., watching the teacher write it) may result in more acquisition of the additional stimuli (i.e., spelling), but also results in longer instructional sessions
 - 4.1.4 The addition of extra, related, non-target stimuli in the antecedent portion of trials may interfere with acquisition of the

target response when children do not have a history of direct instruction

4.2 Findings from the use of instructive feedback

4.2.1 When instructive feedback has been used (a) with response prompting strategies, (b) in direct instruction, (c) with identified reinforcers, (d) with multiple target behaviors being taught simultaneously, (e) with delivery of the instructive feedback following each correct child response, (f) with only pre- and posttest assessment, and (g) with consistent and static presentation of the instructive feedback stimuli, then students acquire some, if not all, of the instructive feedback stimuli

4.2.2 This finding (i.e., 4.1.1. above) has occurred for (a) preschoolers with developmental delays, moderate mental retardation, and hearing impairments; (b) elementary-aged children with learning disabilities, behavior disorders, mild mental retardation, and moderate mental retardation; and (c) adolescents with moderate mental retardation and behavior disorders

4.2.3 The types of behaviors taught in the instructive feedback studies are presented below; as shown, a range of behaviors have been successfully acquired

Target	Instructive Feedback
Naming number sets	Naming numerals
Naming numerals	Reading number words
Naming coin values	Number words, numerals
Matching factions	Matching equivalent fractions
Naming photographs	Reading words
Reading words	Stating a definition
Reading words	Spelling those words
Stating facts	Stating related facts
Naming photographs	Stating information about photos
Naming shapes	Stating color of shapes
Identification of	Classification of symbols
Rebus symbols	
Stating antonyms	Reading word, definitions

- 4.2.4 Acquisition of instructive feedback stimuli has occurred in a variety of instructional arrangements, including (a) one-to-one instruction, (b) small group instruction (3-5 students), (c) transition-based teaching, and (d) computer-assisted instruction
- 4.2.5 Teachers of preschool, elementary, and secondary students have implemented the instructive feedback procedure correctly during direct instructional sessions, and teachers of preschool children have implemented it reliably in transition-based teaching arrangements
- 4.2.6 Instructive feedback stimuli have been presented verbally (i.e., teacher says it), visually (i.e., on cards or photographs), verbally and visually (teachers says it while showing a card/picture), and verbally and through manual sign (i.e., through total communication)
- 4.2.7 Instructive feedback stimuli have been acquired (a) when one instructive feedback stimulus is presented for each target behavior; (b) when two instructive feedback stimuli are presented for each target behavior either simultaneously on each trial or separately on alternating trials (however, the difficulty and whether children have a referent for the instructive feedback stimuli may influence the occurrence and amount of acquisition); and (c) when the instructive feedback stimuli are related (within the same curricular domain) or unrelated (in a different curricular domain) to the target stimuli
- 4.2.8 When the instructive feedback stimuli involve behavior that will taught directly in the future (i.e., parallel instructive feedback stimuli), students learn the "future" target behaviors that were presented through instructive feedback more rapidly than similar target behaviors that were not presented through instructive feedback; however, all studies of this issue have involved the same response to various forms of the stimulus)
- 4.2.9 Use of instructive feedback does not appear to interfere with the rapidity with which target behaviors are acquired, or to increase substantially the length of instructional sessions
- 4.2.10 In small group instruction, students sometimes acquire a portion of their peers' target and instructive feedback stimuli

4.2.11 Use of specific attending cues (e.g., asking children to repeat the task direction) as compared to general attending cues (e.g., asking them to look at the target stimulus) appears to increase the probability of students learning their peers' instructive feedback stimuli

4.2.12 When instructive feedback is structured such that equivalent relationships can be established and tested, stimulus classes are sometimes formed -- particularly, if the instructive feedback stimuli are less complex or less difficult than the target stimuli

5.0 Recommendations for Use of Manipulations of the Attending Cues/Responses and Instructive Feedback

- 5.1 Both manipulations of attending cues/responses and instructive feedback should be used in the context of direct instruction**
- 5.2 Use of manipulations of attending cues/responses and instructive feedback should be planned carefully**
- 5.3 Manipulations of the attending cues/responses should be used when students are not making adequate progress, but reinforcers have been identified and used, the skills being taught are appropriate, the instructional strategy being used has been effective with similar students and skills, and the instructional strategy is being used correctly**
- 5.4 Manipulations of the attending cues/responses should be monitored carefully to ensure that they do not increase session length substantially and do not interfere with acquisition of the target behaviors**
- 5.5 Instructive feedback has been used with such wide variety of learners, skills, and instructional arrangements and as a result, teachers are encouraged to employ it throughout their direct instructional activities**